

REMARKS

Favorable reconsideration of this application, in view of the above amendments and in light of the following remarks and discussion, is respectfully requested.

Claims 1-6 are currently pending in the application; independent Claims 1 and 2 having been amended, and new dependent Claims 3-6 having been added, by way of the present response. Specifically, Applicants respectfully assert that independent Claims 1 and 2 have been amended in a non-narrowing manner to place the claims in better condition for examination. Applicants respectfully assert that support for these changes to the claims is self-evident from the originally filed disclosure, including the original claims, and that therefore no new matter has been added.

In the outstanding Office Action, independent Claim 1 was objected to, and Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,376,128 to Bozeman, Jr. (Bozeman), and under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,272,479 to Farry et al. (Farry).

In the Office Action, independent Claim 1 was objected to because the first line of the claim did not contain spaces between words. In response, Applicants have amended the claim in a non-narrowing manner to include spaces between words. Thus, Applicants respectfully request that the objection to independent Claim 1 be withdrawn.

In the Office Action, Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) as being anticipated by Bozeman. Claims 1 and 2 were also rejected under 35 U.S.C. § 102(e) as being anticipated by Farry. Applicants respectfully request withdrawal of the rejections of the claims for the following reasons.

The present invention is directed to myoelectric pattern classification methods and apparatuses. Independent Claim 1 recites the method including extracting a feature pattern from a myoelectric pattern that is a muscle action potential using logarithmic transformation

processing. Independent Claim 2 recites the apparatus including a feature-pattern extraction apparatus configured to use a logarithmic transformation apparatus to extract a feature pattern from a myoelectric pattern that is a muscle action potential.

Bozeman is directed to a control system for prosthetic devices. As shown in Figure 3, for example, of Bozeman, a moveable body part 302 provides motion detected by a sensor/transducer 304, which provides an analog signal 306. The analog signal 306 is provide to a linearizer 310, which creates a linear sensing signal 312. The linear sensing signal 312 is provided to a normalizer 316, which provides a normalized signal 318. The normalized signal 318 is provided to a discriminator 322. The discriminator 322 generates specific command signals 324. The command signals 324 are provided to a converter 328. The converter provides four distinct options: the command signals can be sustained linear commands 330, sustained logarithmic commands 332, unsustained linear commands 334 or unsustained logarithmic commands 336. The respective commands are provided to an electromechanical device 356 in operational association with a prosthesis 358.¹

Applicants respectfully assert, however, that Bozeman does not teach the claimed features of extracting a feature pattern from a myoelectric pattern using logarithmic transformation processing or an apparatus configured to use a logarithmic transformation apparatus to extract a feature pattern from a myoelectric pattern, as recited in independent Claims 1 and 2. Specifically, Applicants respectfully assert that Bozeman does not show or state using logarithmically transformation to extract a feature pattern from a myoelectric pattern (i.e., to extract a feature pattern from the analog signal 306 provided by the sensor/transducer 304 detecting motion provided by the movable body part 302). Rather, Applicants respectfully assert that at most Bozeman states that logarithmic commands 332,

¹ Column 7, lines 4 to 32, of Bozeman.

336 are provided to the electromechanical device 356 in operation with the prosthesis 358 (i.e., that logarithmic commands move the prosthesis 358).

Specifically, independent Claim 1 recites “extracting a feature pattern from a myoelectric pattern that is a muscle action potential using logarithmic transformation processing.” Independent Claim 2 recites “a feature-pattern extraction apparatus configured to use a logarithmic transformation apparatus to extract a feature pattern from a myoelectric pattern that is a muscle action potential.” Thus, Applicants respectfully request that the rejection of independent Claims 1 and 2 under 35 U.S.C. § 102(b) in view of Bozeman be withdrawn.

Farry is directed to a method of evolving classifier programs for signal processing and control. As shown in Figures 1-4, for example, of Farry, in a process to calculate signal features, single event data 1035 is passed-through domain-specific filters or transformations that affect amplitude, offset, phase and weight to enhance signal-to-noise ratio and to produce values use in calculating signal features. At 3020, fourteen generic signal features known to contribute generally to a solution of signal classification problems are calculated on the single event data. A genetic programming process will determine, through an evolutionary process, which features are most appropriate for solving the classification process, to provide a single event features set 1040.² In a process to evolve signal classifiers, at 4010 every feature value for every signal event in a training database is normalized. At 4210, a genetic programming process, during an evolutionary process, applies functions in a function set to feature values. The function set consists of logical, mathematical and domain-specific functions. Mathematical functions known useful to signals and their classification include a natural logarithm and base 10 logarithm.³

² Column 13, lines 48 to 63, of Farry.

³ From Column 14, line 7 to Column 15, line 2, of Farry.

Applicants respectfully assert, however, that Farry does not teach the claimed features of extracting a feature pattern from a myoelectric pattern using logarithmic transformation processing or an apparatus configured to use a logarithmic transformation apparatus to extract a feature pattern from a myoelectric pattern, as recited in independent Claims 1 and 2. Specifically, Applicants respectfully assert that at most Farry states that logarithms may be performed on features values. However, Applicants respectfully assert that during the evolutionary process of the genetic programming process of Farry, other logical, mathematical and domain-specific functions, that do not include logarithms, may be applied to feature values.

Further, Applicants respectfully assert that because Farry uses the evolutionary process of the genetic programming process, Farry suffers from a number of disadvantages and does not provide the advantages of the claimed features recited in independent Claims 1 and 2. Specifically, because Farry requires the use genetic programming processes to determine through evolutionary processes fourteen generic signal features to be calculated as well as the application of multiple functions in the function set to feature values, the device of Farry cannot be made small and light, and therefore is not well suited for use in a prosthetic device. In contrast, Applicants respectfully assert that the claimed features recite in independent Claims 1 and 2 do not suffer from these disadvantages, and can provide, for example, high-speed operation by using logarithmic transformation to extract a feature pattern from a myoelectric pattern.

Thus, for the above reasons, Applicants respectfully request that the rejection of independent Claims 1 and 2 under 35 U.S.C. § 102(e) in view of Farry be withdrawn. Applicants respectfully request, as the outstanding grounds of rejection have been overcome, the allowance of independent Claims 1 and 2.

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New dependent Claims 3-6 are allowable for the same reasons as independent Claims 1 and 2, from which they depend, as well as for their own features. Thus, Applicants respectfully request the allowance of new dependent Claims 3-6.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-6 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below listed telephone number.

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Respectfully submitted,

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